

@Scale Initiative

Transforming STEM education through project, process and systems alignment

January
2014-2015



What is @Scale?

@Scale is a Governor's STEM Advisory Council strategic initiative that directs public and private resources to support an integrated portfolio of STEM education enrichment projects that are aligned to advance the goals of the Commonwealth's STEM Plan.

What are the characteristics of @Scale projects?

@Scale projects are projects that already exist and can demonstrate success. These projects are designed for easy replication and can scale quickly in order to serve a large number of students and adults. The portfolio of projects address the spectrum of **Science, Technology, Engineering and Mathematics** across learning levels from Pre-K through elementary, secondary and college/workforce.

How are @Scale projects selected?

@Scale projects are selected through a competitive solicitation process. Qualifying projects meet selection criteria set by the STEM Council. The selection of the current @Scale projects occurred in four phases. Currently, the Council is taking this year to look at the projects that have been selected and will hold off on issuing any new solicitations until at least January 2015.

How are @Scale projects funded?

@Scale projects are funded on a ratio of \$1:3 in public:private dollars. For every state dollar awarded from the Massachusetts' STEM Pipeline Fund, @Scale projects must secure \$3 dollars in private matching funds (businesses, foundations, etc.) To date, the @Scale Initiative has secured **\$2.6M** in private funds and disbursed **\$1M** in @Scale grants. The remaining private funds are in process of being secured.

How many projects make up the @Scale Portfolio?

There are currently **17** projects in the @Scale portfolio. Together these projects reach over **8,000** students, **220** teachers, **60** displaced workers and **96** employers. Learn more about each project inside.

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@Scale Model

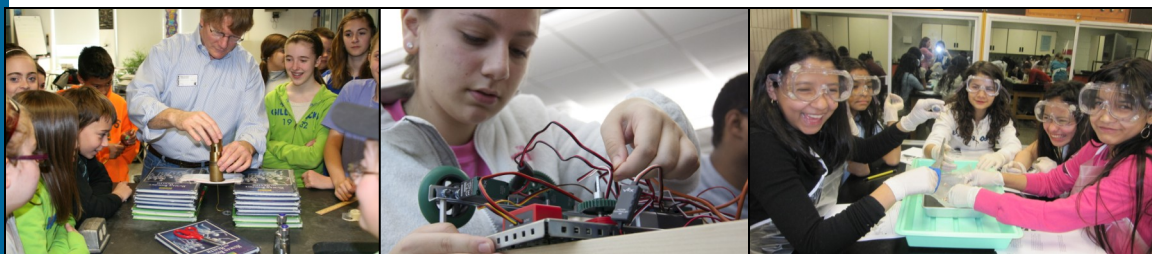
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"Through the @Scale Initiative, Massachusetts stands at the forefront of innovative strategies for expanding effective STEM programs designed to strengthen the pipeline of STEM skilled students and adults to be interested and ready for the workforce."

Rep. Joseph Kennedy,
U.S Congress

"The @Scale initiatives are critical to ensuring Massachusetts continues to be a world leader in innovation. By bringing together the state's public and private resources, @Scale is successfully helping prepare our future STEM leaders."

Dr. Jeffrey Leiden, Chair-
man, President and CEO
of Vertex Pharmaceuticals



@Scale Endorsed Projects

Phase I - Student Interest/Readiness



BioTeach is MassBioEd's signature multi-year science education program designed to bring cutting-edge biotechnology curriculum and experiences to more students, teachers, and schools across the state. Through a combination of grants for school labs, student career exploration experiences, and teacher training and mentorship, BioTeach is cultivating the scientific leaders of tomorrow. Over an eight year period, BioTeach has supported 189 Massachusetts high schools and has provided professional training for more than 750 educators in the Commonwealth. Contact: Lance Hartford at lance.hartford@massbio.org or 617-674-5131. www.massbioed.org.



DIGITS is a classroom program that pairs STEM professionals with sixth-grade classes throughout the state to increase students' interest in STEM subjects and careers. STEM volunteers meet and talk with students about their careers, lead students in interactive STEM-related exercises, and serve as role models. The program, which is based on a uniquely designed alphabet with STEM icons embedded in each letter, takes place in a math or science class. Participating teachers get access to an online portfolio of additional STEM activities to supplement classroom instruction. Contact: Joyce Plotkin at joyce@digits.us.com or (617) 694-7309. www.digits.us.com.



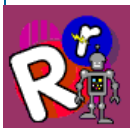
MASS MATH + SCIENCE INITIATIVE was created to drive a school culture of high expectations by dramatically increasing participation and performance in Advanced Placement courses, particularly among underserved populations, to prepare students for college and career success in science, technology, engineering, and mathematics (STEM). MMSI focuses on three measurable goals: 1) Increase AP participation, 2) Increase AP performance and 3) Increase College Success. MMSI is currently working directly with over 8,000 students in 64 high schools across the Commonwealth. Contact: Jeff Mahoney at jmahoney@massinsight.org or (617) 778-1507. www.massinsight.org/mmsi.



Project Lead The Way's world-class, activity-, project-, problem-based STEM curriculum and high-quality teacher professional development, combined with an engaged network of partners, help students develop the skills to succeed in our global economy. PLTW's programs include Launch for grades K-5; Gateway for grades 6-8; Engineering, Biomedical Science, and Computer Science for grades 9-12. Over 5,000 schools in all 50 states offer PLTW programs, including 50 schools across Massachusetts. WPI is one of PLTW's 50 affiliate universities and offers Core Training each summer to prepare educators to teach PLTW courses. Contact: Terry Adams at tadams@wpi.edu or (508)831-5198. www.pltw.org



Massasoit Community College's Science Transfer Initiative (STI) has a goal of increasing enrollment, retention, and diversity in science majors and careers by providing early undergraduate research, enhanced advising, exposure to science career paths, and access to financial aid to encourage them to enroll in a science major and persist to a degree. Enrollment in the college's Science Transfer program has grown by 400% and transfers have increased by 359%. Massasoit partners with other community colleges to increase the program's impact. Contact Michael Bankson mbankson@massasoit.mass.edu or (508) 588-9100 X2109 www.massasoit.mass.edu/



Advanced Robotics Intensive (ARI), through Quinsigamond Community College, introduces students to many STEM topics at one time (engineering, electronics, physics, computer programming, etc.), providing math and science enrichment and real life teamwork experiences. ARI utilizes a variety of approaches to robotics like summer camps and middle school after-school programs. Students participate in "kick-offs", practice sessions and competitions at QCC. Teams pair up to work on a unique challenge (i.e. a series of "obstacles" on a game board) and compete with other schools, which fosters awareness of others, collaborative innovation and strategy. Contact: Betty Lauer at blauer@qcc.mass.edu or (508) 854-2765. www.qcc.edu.



National Center for Technological Literacy
Museum of Science, Boston

The *Gateway to Technology and Engineering* program was established to help school districts develop strategic plans to implement K-12 technology and engineering programs, while introducing educators to resources supporting standards-based curricula and assessments. *Gateway* holds a summer institute demonstrating tools and related activities focusing on technology/engineering standards. District teams of educators and administrators are introduced to curricula and resources from a range of sources so they can develop a strategic action plan for their district. In addition to the summer institute, there are two progress sessions, a site visit and an annual symposium. Contact: Yvonne Spicer at yspicer@mos.org or (617) 589-3101. www.mos.org/nctl/k12_gateway.php

@Scale Endorsed Projects

Phase II – College Degrees & Workforce Development



UMass “ABLE 4 STEM” denotes Associate’s and Bachelor’s Linked Education (ABLE) at four UMass campuses (4) in STEM disciplines. UMass works with the 15 MA public community colleges in a comprehensive, student-focused approach that aims to double the number of STEM degrees awarded at both the associates of science and bachelor of science levels over a four year period. Contact: John Cunningham at:

jcunningham@umassp.edu or (617) 287-7050. www.able4stem.org



BATEC’s “Big Data” program provides training and curriculum development for faculty in order to build the necessary programs for students as well as displaced and incumbent workers seeking to upgrade or develop their knowledge and skills in Information Technology. BATEC has scaling plans to expand their programming to Roxbury Community College, Northern Essex Community College, Quinsigamond

Community College and Holyoke Community College. Contact: Deb Boisvert at Deborah.Boisvert@umb.edu or (617) 287-7295. www.batec.org.

MCCANN TECHNICAL SCHOOL

“Western Regional Partnership” is a workforce development project in the areas of advanced manu-

facturing. The educational institutions that make up the STEM Western Regional Partnership, which include the McCann Technical School, Putnam Vocational High School, Westfield Vocational High School and Franklin County Vocational High School, currently offer Chapter 74 approved technical programming in advanced manufacturing, precision manufacturing and machine tools. Contact: James Brosnan at jbrosnan@mccanntech.org or (413) 663-5363. www.mccanntech.org.



MCLA’s “STEM Pathways Project” (SSPP) promotes student success with the goal to increase graduation rates by providing strategic and successful initiatives which address students’ academic, experiential, and career awareness interests. MCLA’s SSPP employs a STEM retention plan, starting with activities for freshman and continuing through senior year. Administered through the MCLA Center for Student Success and Engagement (CSSE), the program delivers enhanced academic support, advising, and career planning, and marshals the efforts of both the academic affairs and student affairs divisions. Contact: Monica Joslin at m.joslin@mcla.edu or (413) 662-5242. www.mcla.edu.



Central Mass WIB’s “STEM Power” project re-engineers Career Center practices, procedures and policies to provide a sector-based approach to nearly all facets of the services offered to dislocated workers including job seeker STEM pathways outreach, orientation and educa-

tion; STEM related pathways career counseling; training; placement for job seekers; and STEM employer engagement and support. 16 local Workforce Investment Boards (WIBs) and their One-Stop Career Centers are partners in this project. Contact: Jeffrey Turgeon at TurgeonJ@worcesterma.gov or (508) 799-1590 www.worcesterma.gov/development.

@Scale Endorsed Projects

Phase III & IV – Student Interest/Achievement & Educator Effectiveness



**BOSTON
K1DS**

is designed to improve mathematics instructional quality in pre-kindergarten (pre-K) programs, using the Building Blocks curriculum and Boston Public Schools (BPS) coaching supports. This hybrid model has demonstrated strong gains in student engagement and mathematics learning in BPS pre-K classrooms and has contributed to closing the achievement gap. Ten community-based organizations receive curriculum materials, professional development, and classroom-based support. All programs are located within high needs areas of Boston, serving approximately 200 low-income, at-risk pre-K students. Contact: Michelle High-Mckinnon at mhighmckinnon@bostonpublicschools.org or 617-635-9063. <http://bpsearlychildhood.weebly.com/boston-k1ds.html>



Science from Scientists (SfS) sends real, charismatic scientists into classrooms during the school day every other week throughout the year to teach hands-on, frameworks-relevant STEM lessons to students in grades 4-8. The goals of the SfS program are to improve student attitudes and aptitudes in STEM (evaluated by student performance on the STE MCAS and pre- and post- quizzes throughout the year) and to support classroom teachers through a free Professional Development Program designed to build on SfS classroom visits. SfS serves over 2,500 students in 23 schools in Eastern Massachusetts. Contact: Erika Angle at erika@sciencefromscientists.org. Web: <http://sciencefromscientists.org/>



ISS PROGRAMMING CHALLENGE

is a fun, flexible, rigorous summer STEM program for middle school students, targeting under-served and under-represented youth. Students work in teams to learn about computer programming, robotics, and space engineering while gaining hands-on experience coding SPHERE satellites. The program culminates in a tournament where teams compete for a spot to race a SPHERE satellite against other teams aboard the International Space Station (ISS). The Massachusetts Afterschool Partnership (MAP) plans to scale up Zero Robotics across Massachusetts. Contact Katie Magrane at kmagrane@massafterschool.org or (617) 338-0040. www.massafterschool.org.

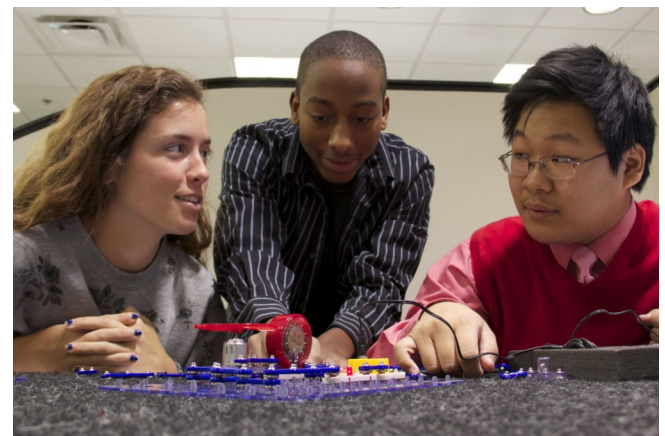


is a team based transformative educational program designed for 6th, 7th, and 8th grade students in which students imagine and design cities of the future and explain the underlying technologies and design principles that would make their city possible. Students create both physical scale models and virtual models (utilizing Sim-City software), prepare presentations/Q&A responses, and write research documents as part of their engineering design process. Future City is an engaging way to build students' 21st century skills while they apply math and science concepts to real-world problems. For more information contact Reed Brockman at reed.brockman@aecom.com, 617-240-7979 or Meelynn Wong at mwong@mnreb.org, 617-871-1115.



Increasing Accessibility to Algebra & Geometry for All Students (IAAG) is a teacher professional development project, which offers math content and pedagogical strategies for general education, ELL and special education mathematics teachers of grades 5 through 10. It strengthens teachers' understanding of various algebraic and geometric concepts. Teachers learn universal design strategies and techniques to increase accessibility of rigorous mathematics to a broad range of learners. The IAAG training has been vetted and approved for both the Massachusetts' Department of Elementary and Secondary Education's (DESE) Professional Development Institute (PDI) and the District and School Assistance Centers (DSAC). Contact: Karin LeBeau at Karin.lebeau@umassmed.edu or (508) 856 - 1529.

@Scale Projects in Action



@Scale Initiative

History

The Massachusetts Governor's STEM Advisory Council launched the @Scale Initiative, referred to simply as **@Scale**, in response to calls from educators as well as funding organizations. Both groups sought a cohesive system of STEM projects to engage, inform and support students while complementing teaching and learning practices, in both formal and informal education settings. Educators called for guidance in their process of adopting projects demonstrating efficacy in teaching and learning practices and that align with statewide strategies, curriculum standards and frameworks. Funders sought similar guidance to better inform their investments of limited yet strategic philanthropic resources in support of local education priorities with the intent to achieve quantifiable, statewide impacts.

@Scale addresses the concerns of both educators and funders by focusing public and private resources in support of an integrated portfolio of education enhancement projects aligned to achieve the goals of "A Foundation for the Future: Massachusetts Plan for Excellence in STEM Education," which is the Commonwealth's STEM plan. For every state dollar, @Scale projects have to secure a three dollar match. Projects selected for @Scale endorsement are designed for easy replication and scale-up while also demonstrating success in achieving student outcomes.

The 17 projects currently in the @Scale portfolio were identified and selected by the STEM Council in four phases with each phase targeting one or two of the state STEM goals. Phase I focused on the goals of student interest and achievement. Phase II addressed the goals of improving post-secondary graduation rates and fulfilling near-term workforce shortages. Phase III & IV, which were combined, focused on projects

that address student achievement and educator effectiveness in elementary and middle grade levels and/or student interest and educator effectiveness in pre-K education programs. The grid to the right provides a visual on how the portfolio of projects address the spectrum of Science, Technology, Engineering and Mathematics across learning levels.

	Science	Engineering	Technology	Math
Post-Secondary, Workforce Development	STEM Power			
	MCLA STEM Pathways			
	ABLE4STEM		BATEC: Big Data	
	MCC Science Transfer		Advanced Manufacturing	
High School	MMSI	Bio-Teach	Project Lead The Way Gateway to Technology & Engineering ----- QCC Robotics	UMMS RSRC Increasing Accessibility to Algebra and Geometry MMSI
Middle School	Science From Scientists	DIGITS	Future Cities Zero Robotics	DIGITS
Elementary School				
Early Education				Boston K1DS

David Cedrone 2014